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a cover comprising the reaction product of 100 PPHR of toluene diisocyanate @ 6% [nitrogen, carbon, oxygen] NCO [content] and polytetramethylene ether glycol content, 13.2 PPHR of a curative comprising diethyl-2,4-toluenediamine and dimethylthio-2,4-toluenediamine at a 50:50 weight ratio and, 2.3 PPHR pigment so that the overall ball diameter is about 1.68".

REMARKS

Introduction

Responsive to the communication mailed December 27, 1999, Applicants provide the following remarks. Reconsideration and reexamination of the application in view of the above amendments and the following remarks are requested.

Prior to responding to the substance of the prior art rejection, a brief narrative directed to problems of the prior art and how they are solved by the golf balls made by the present process appears desirable.

Historically, as described in the specification on pages 1 through 3, golf ball covers were made from balata or balata-type materials such as transpolyisoprene-based compounds. Though possessing many desirable properties, the use of balata or balata-type materials has many drawbacks, including the fact that golf balls made of these materials are expensive to manufacture and have relatively short life span. In response to these drawbacks, the golf ball manufacturing industry shifted to the

use of synthetic thermoplastic materials, most notably ionomers sold by E.I. DuPont DeNemours & Company under the name Surlyn®.

Another approach taken to provide a golf ball cover with the playing characteristics of balata is to use a polyurethane cover composition made from a mixture comprising a diisocyanate, a polyol, and either a curing agent or a catalyst. Why is a catalyst needed? The answer is that the industry needs to manufacture more than one golf ball at a time. Without a catalyst or some method of speeding up the curing process, the curing process for polyurethane golf ball covers would be sufficiently long to render the manufacturing of polyurethane-covered balls economically unfeasible.

One approach to providing a polyurethane cover composition without the use of a catalyst, but with the use of a fast-reacting prepolymer system, is disclosed in U.S. Patent No. 5,334,673 ("the '673 patent") by Wu assigned to the Acushnet Company. Applicants' specification, page 4, lines 18 through 26, describes this feature of the Wu patent, as well as the manufacturing problems inherent therein:

The '673 patent discloses a cover composition comprising a diisocyanate, a polyol and a slow-reacting polyamine curing agent. The diisocyanates claimed in the '673 patent are relatively fast-reacting. Due to this fact, catalysts are not needed to lower the activation energy threshold. However, since relatively fast-reacting prepolymer systems are used, the reaction rate cannot be easily controlled thereby requiring the implementation of substantial processing controls and precise reactant concentrations in order to obtain a desired product.

The implementation of extensive processing controls needed to carry out the method of the '673 patent render the corresponding manufacturing process expensive.

The specification, beginning at page 5, lines 1-7, describes an industry attempt at using a catalyst instead of the fast-reacting prepolymer system like that of the '673 patent:

To avoid the problems associated with fast-reacting prepolymer systems, slow-reacting systems such as Toluene diisocyanate (TDI) prepolymer systems can be employed. However, these systems, while avoiding the problems associated with fast-reacting systems, present similar problems, albeit for different reasons. The most noteworthy problem with slow-reacting prepolymer systems is the requirement for a catalyst.

A primary goal of the industry is to produce high quality golf balls economically. However, the need for a catalyst with the slow-reacting prepolymer systems adds substantially to the cost of golf ball manufacturing because the use of a catalyst makes it difficult to control the reaction. This problem is discussed in the specification, page 5, lines 8 through 12:

By introducing a catalyst into the system, processing problems similar to those associated with fast-reacting pre-polymer systems are virtually inevitable. As is well known in the art, the use of a catalyst can severely restrict the ability to control the speed of the reaction, which is undesirable.

The present invention eliminates both the problems associated with the Wu fast-reacting prepolymer system of the '673 patent, and problems associated with the use of a catalyst. The specification, page 5, lines 13 through 18, describes how the invention solves these problems by providing a composition that does not require a catalyst:

It has now been discovered that a blend of diamine curing agents with slow-reacting prepolymer systems eliminates the problems associated with catalysts while maintaining the advantages associated with slow-reacting prepolymer systems.

The specification at page 6, lines 14 through 16, summarizes:

“The curing agent is a blend of a slow-reacting diamine with a fast-reacting diamine such as dimethylthio 2,4- toluenediamine and diethyl 2,4- toluenediamine, respectively.”

The specification on page 11, lines 4 through 9, further points out the advantages of the invention over the prior art:

It has now been discovered that a blend of a slow-reacting curing agent and a fast-reacting curing agent eliminates the problems associated with using either type of curing agent in isolation. The ultimate result of such a combination is the realization of greater control and concomitant flexibility over the reactions used to produce urethane elastomers.

Therefore, with the use of the blend of curing agents in the invention, the problems associated with both the fast-reacting prepolymer system of the '673 patent and the problems associated with catalyst-based systems are eliminated, and golf balls of high quality can be produced by the method of the invention at a fast, economically feasible rate.

The rate of production is further significantly enhanced by the elimination of a long post-cure period as a result of the invention. The specification, beginning at page 11, line 25, describes the long cure period of the prior art:

For example, it is not unusual for golf balls made with known polyurethane systems to require a post cure at temperatures exceeding 140 degrees F for over eight hours.

The specification also describes, page 12, at lines 2 through 9, the elimination of potential detrimental effects caused by typical curing periods on the golf balls produced by the method of the invention. Also described, on page 12, is the use of toluene diisocyanate (TDI) in the invention. On page 13, at lines 6-11, the advantages of TDI in the present invention are described:

In contrast, a TDI-based system is essentially a low-cost 'room temperature cure system' in that once the TDI-based polyurethane prepolymer is reacted with the curing agent blend, the composition can be cured at room temperature. This prevents any adverse effects an elevated curing temperature could have on the threading and/or core of the golf ball being produced.

The above features are supported by the cited references to the specification. The above narrative shows how the problems of the prior art are solved by the process of the invention.

Accordingly, the claims to the golf ball of the invention have been amended to point these features out more clearly.

The Rejections

In paragraph 1, claim 43 has been rejected under 35 U.S.C. § 112, second paragraph for not appropriately claiming what the inventors consider to be their invention. In response, claim 43 has been amended to delete the terms (nitrogen, carbon, oxygen) that are ambiguous, and to recite that a cover comprises "the reaction product of 100 PPHR of toluene diisocyanate @ 6% NCO and polytetramethylene ether glycol content," thereby rendering the rejections moot. Support for the language of the

amended claim is found in the specification on page 24, lines 15-17:

“To produce a golf ball in accordance with the invention, in a preferred embodiment, 100 PPHR of prepolymer (low free TDI @ 6% NCO and PTMEG) is heated to 140°F in vat 1 as shown in FIG. 3.”

In paragraph 3 of the Office Action, claims 30-43 have been provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 3-12 of copending Application No. 09/018,283.

In the case of common ownership of two co-pending applications, a terminal disclaimer can be used to obviate an obviousness-type double patenting rejection.

Applicants acknowledge that the subject matter of the various claims in the two applications was commonly owned at the time any inventions covered therein were made. Therefore, a terminal disclaimer can obviate a double patenting rejection if there exists even a slight difference in scope between the claims of the two applications.

There is, in fact, a difference in scope between the claims of the two copending applications. In response to an Office Action filed September 13, 1999, applicants cancelled all claims in the present case except those directed to a golf ball *per se*. The claims presently on file in the present case are directed to a golf ball with a polyurethane cover and a large core.

In the copending Application No. 09/018,283, all composition claims have been cancelled and there remain only process claims.

Based on the foregoing discussion, Applicants point out that there is a difference in scope between the copending applications. Further, each of the applications has been limited to a specific slow-acting diamine, namely, dimethylthio-2-4-toluene diamine, and a faster-reacting diamine.

In order to obviate a potential double patenting rejection, Applicants are filing herewith a Terminal Disclaimer. By disclaiming the terminal portion of the term of the later patent, the potential problem of extending patent life is eliminated. A check for the fee is submitted herewith.

In paragraph 4, the Examiner reminds the Applicants of their obligation under 37 C.F.R. 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made. In response, Applicants acknowledge that the subject matter of the various claims in the two applications was commonly owned at the time any inventions covered therein were made.

In paragraph 5, claims 30-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kato et al. ('852) or GB 2,301,291, each in view of Wu ('673) and Isaac ('568) and Presswood ('298).

Applicants acknowledge that Kato,('852), GB 2,301,291, and Wu ('673) disclose

thread-wound center golf balls where the winding and center are similar but not identical to those claimed by applicants. However, the cover of the golf balls disclosed in these references is significantly different. One significant difference is that the golf balls disclosed in these references cannot be made as easily on a production line as the golf ball of the present invention.

In paragraphs 6, 7, 8, and 9, the Examiner refers to some of the disclosures of Wu, Isaac and Presswood. In paragraph 8, the Examiner states that

...it would have been obvious to one of ordinary skill in the art to utilize the curing agent blend of Presswood with the prepolymer of Wu in accordance with the teachings of Isaac, so as to obtain a golf ball cover composition suitable for use with the wound cores of the primary references.

The Examiner has cited patents teaching polyurethane golf balls. However, processing polyurethane has a number of problems associated with it, as described above. These are all problems well understood by polymer chemists, problems which have not been solved heretofore by combining the references cited by the Examiner. There is no suggestion in the prior art represented by the cited references that they be combined in the manner proposed by the Examiner. Absent such a suggestion, there would be no reason why one skilled in the art, who were faced with the same problems confronting the Applicants, and who had no prior knowledge of Applicants' claimed structure, would consult the particular combination of references suggested by the Examiner.

It is believed that the present invention as claimed is directed to a great advance in the art in that by following the invention as set forth in the claims, a golf ball is

produced that has excellent “click” and “feel” characteristics and will allow a golfer to impart adequate backspin. It also has excellent durability.

Furthermore, and more significantly, from a patentability point of view, the chemistry is a chemistry that enables the ball to be produced on an assembly line. A key feature of the golf ball of the present invention is that the polyurethane employs a curing agent that is a mixture of a fast-reacting diamine and a specific diamine that has a reaction rate that is slower than the fast-reacting diamine. These two diamines enable the curing to take place at a rate which enables the core to be placed in the liquid polyurethane in the first instance in a first mold half and be inverted into a second mold half in the second part of the process.

Furthermore, it is the combination of the particular diisocyanates claimed, that is, toluene diisocyanate, 4,4'-diphenylmethane diisocyanate, Isophorone diisocyanate, which together with a polyol and the curing agent blend produce a cover with the properties of balata. These features are expressly and adequately set forth in the golf ball claims, in combination with the specific combination of diamines.

Applicants have amended the claims, and it is believed that if these amendments are entered, it will remove the basis for the rejections in paragraph 5.

The claims all recite the specific diisocyanates used in the covers of the claimed golf balls. Isaac is silent on the specific diisocyanates used. Accordingly, new claims 30 and 43 are not anticipated by Isaac. Furthermore, Isaac cannot have any § 103(a) applicability because Isaac does not teach the same polyurethane ball that applicants are claiming. Reconsideration and removal of the rejections are respectfully requested.

The references Kato, GB 2,301,291, Wu, Isaac and Presswood simply do not disclose the polyurethane composition for a golf ball to which Applicants' claims, as amended, are limited. There is no suggestion in the prior art that the references be combined in the manner suggested by the Examiner. Thus the Applicants respectfully submit that the references are inappropriate.

Furthermore, in claims 38-43, limitations drawn to the size of the golf ball center in a three-piece golf ball and core in a two piece golf ball are set forth.

The significance of these limitations is that the center or core diameter sizes claimed, are possible due only to the durability characteristics of polyurethane-based golf ball covers. Because of the durability, a relatively thin cover and large center or core can be used to make a golf ball in accordance with USGA golf ball size specifications. Prior art golf balls require a much thicker cover in order to preserve durability characteristics.

It is the core or center of a golf ball that is primarily responsible for the distance characteristics of golf balls. To optimize distance characteristics, golf ball manufacturers would like to increase the size of golf ball cores or centers. The polyurethane cover composition devised by the Applicants as set forth in the claims, enables golf balls to be made with large centers or cores, and to be made on an assembly line. None of the references alone, or in an obvious combination teach a golf ball having the novel polyurethane composition and the large diameter center or core.

Applicants further submit that Presswood is totally irrelevant because its teachings

do not relate, in any way, to golf balls. There is not teaching or motivation in Presswood that would motivate one having ordinary skill in the art to combine the teachings of Presswood with any of the other references which are drawn to golf balls. Furthermore, Presswood does not disclose the exact diamine-based curing agent blend set forth in the claims. Accordingly, Applicants respectfully submit that new claims 30-43 are not rendered obvious by Presswood in combination with any of the other references.

Applicants further submit that it is not always obvious to take known variables and combine them in a particular way. Section 103 sets as the standard of patentability the nonobviousness of the invention at the time the invention was made to a person having ordinary skill in the art.

The inventors have discovered a combination that had eluded the brains of researchers working on the problem. The combination of variables of the invention has substantially different and useful properties which other combinations of the same variables do not possess. The above narrative shows how the problems of the prior art are solved by this invention.

Judge Hand noted in B.G. Corp. v. Walter Kidde & Co., 79 F.2d 20,22 (2d Cir. 1935):

All machines are made up of the same elements; rods, pawls, pitmans, journals, toggles, gears, cams, and the like, all acting their parts as they always do and must. All compositions are made of the same substances, retaining their fixed chemical properties. But elements are capable of an infinity of permutations and the selection of that group which proves serviceable to a given need may require a high degree of originality. *It is that act of selection which is the invention.*

In light of the above remarks, reconsideration and removal of the rejections under 35 U.S.C. § 103 are respectfully requested.

Applicants respectfully submit that in light of the present amendments, if entered, and remarks, all the presently pending claims are now in a condition for allowance. Applicants urge that their claims, as amended, are patentably distinct over all the references or any combination of disclosed, relevant information. Reexamination and reconsideration are, therefore, respectfully requested.

The present application is a continuation in part of Serial No. 09/030,332, which is a continuation in part of Serial No. 09/018,283. A Supplemental Information Disclosure Statement, with copies of references cited in a Supplementary European Search Report received on December 15, 1999 for the corresponding European application 98907548.6 (PCT/US98/03334), was submitted on December 27, 1999, along with a Response to an Office Action on Serial No. 09/018,283.

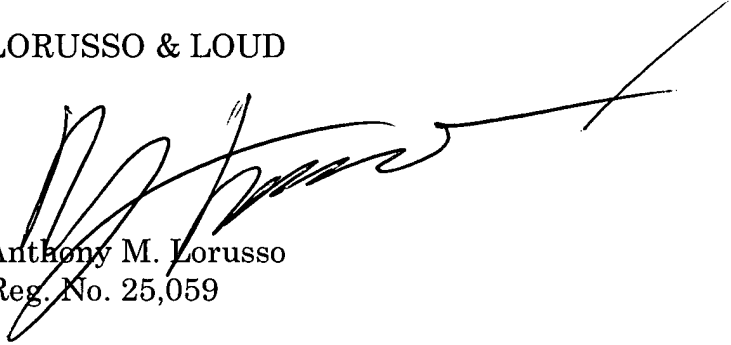
Enclosed with this response is a Terminal Disclaimer and a check in the amount of \$55.00 for the fee required under 37 C.F.R. § 1.20(d). It is believed that no fees are

currently due apart from the fee for the Terminal Disclaimer submitted herewith.
However, in the event of any inadvertent fee deficiency, please authorization is
hereby granted to charge such deficiency to deposit account # 12-2147.

In re Application of Dewanjee et al.
Serial No. 09/137,393
Attorney Docket No. DSCK 525-C3

Respectfully submitted,

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